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4. — *The Botanical Text-Book, for Colleges, Schools, and Private Students ; comprising, Part I. An Introduction to Structural and Physiological Botany. Part II. The Principles of Systematic Botany; with an Account of the Chief Natural Families of the Vegetable Kingdom, and Notices of the Principal Useful Plants.* Second Edition, illustrated with more than a Thousand Engravings on Wood. By Asa Gray, M. D., Fisher Professor of Natural History in Harvard University. New York: Wiley & Putnam. 1845. 12mo. pp. 509.

The first edition of this work, published less than three years ago, was favorably reviewed in our number for January, 1843. The justice of the hearty commendations then bestowed upon it, which have been echoed from the other side of the Atlantic, is confirmed by the call for a new edition. We ought rather to say, that a new treatise has been written to supply the place of the former one. This was rendered almost necessary, indeed ; partly on account of the rapid advancement which physiological botany, no less than all the natural sciences, is continually making ; and partly because Dr. Gray's experience as a teacher, since the first edition was published, has enabled him to discern, as only a teacher can do, the points which were defective, or which required more detailed explanation. He has thus had the advantage of making a practical trial of his own theories, and of the sufficiency of their exposition. The progressive improvement of the whole cousinhood of the sciences has been so marked of late, that it is dangerous now to presume upon an acquaintance with them, merely on the strength of an intimacy formed a few years ago. Stereotype text-books, however they may answer the purpose in other departments of knowledge, which vary only from century to century, are here quite out of the question.

We are glad to see, therefore, that the author of the Botanical Text-Book, on the occasion of a new edition being required, has made such a good use of the opportunity, and of his professional experience, and has recomposed, and almost entirely rewritten, the first, and, in the author's view, the most essential, part of the work, that upon structural and physiological botany, which has here been amplified to nearly twice its former extent. The author correctly remarks in his preface, that " this part of the volume, instead of having been rendered more abstruse by the enlargement, will rather be found to be more simple and generally intelligible than before." This is owing to the greater expansion he has given to the abstruse points, to the increased number of illustrative wood-cuts, which in the new edition is fully doubled, and also to some changes in the style, which has been rendered rather more flowing and narrative, and less terse and axiomatic than before. No doubt, some further changes of the same sort would render it yet more adapted to the end in view; that is, if room can be found for the expansion, for the work has already extended into a bulky volume of above five hundred pages. This is a somewhat unusual fault to find with elementary works, which generally need concentration rather than dilation; but Dr. Gray sometimes expects rather too much of his readers, and appears to forget that a sentence, however clear, may be too compact; and, though it demonstrably embodies the whole idea, may fail to convey it at a glance to those who are not already somewhat familiar with the subject.

The "Preliminary Considerations" of the first edition, which were open to these objections, and must have been difficult for the student to master at the outset, are here omitted, and in their place we have a brief development of the mode in which the leading divisions of the science of botany may be supposed to arise, which strikes us as truly philosophical, and in some respects original. In our former review, we took some exceptions to our author's mode of stating the doctrine of vegetable metamorphosis, as it is, we still think, somewhat inaptly termed. It seemed to savor too much of Wolff's notion, that the vegetable degenerated into the flower. The more detailed statements of the present edition are no longer liable to these strictures. The general laws of vegetation are traced from the stem and foliage into the flower in the following manner.

> "The flower may next be viewed under a more theoretical aspect. In the preceding chapter we have recognized the close analogy of flower-buds to leaf-buds, and consequently of flowers to branches, and of the leaves of the flower to ordinary leaves. The plant continues for a considerable time to produce buds which develope into branches. At length it produces buds which expand into blossoms. Is there an entirely new system introduced when flowers appear? Are the blossoms formed upon such a different plan, that the general laws of vegetation, which have sufficed for the interpretation of all the phenomena up to the inflorescence, are to afford no further clew? Or, on the contrary, now that peculiar results are to be attained, are the simple and plastic organs of vegetation — the stem and leaves — developed in new and modified forms for the accomplishment of these new ends? The latter, doubtless, is the correct view. The plant does not produce essentially new kinds of organs to fulfil the new conditions, but adopts and adapts the old. New laws of development are now introduced; but these operate subordinately to the primary laws of vegetation, instead of subverting them.
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> "In vegetation, new organs are not created for every or any con-

tingency; but the root, stem, and leaves are modified, as circumstances require, to subserve every needful purpose. Thus, the same organ which constitutes the stem of an herb, or the trunk of a tree, we recognize in the trailing vine, or twiner, spirally climbing other stems, in the straw of Wheat and other Grasses, in the columnar trunk of the Palm, in the flattened and jointed Opuntia, or Prickly-pear, and in the rounded, lump-like body of the Melon-Cactus. So, also, the branches harden into spines in the Thorn, or, by an opposite change, become flexible and attenuated tendrils in the Vine, and runners in the Strawberry; or, when developed under ground, they assume the aspect of creeping roots, and sometimes form thickened rootstocks, as in the Calamus, or tubers, as in the Potato. But the type is easily seen through these disguises. They are all mere modifications of the stem. The leaves, as we have already seen, appear under a still greater variety of forms, some of them as widely different from the common type of foliage as can be imagined; such, for example, as the thickened and obese leaves of the Mesembryanthemums; the intense scarlet or crimson floral leaves of the Euchroma, or Painted-Cup, the Poinsettia of our conservatories, and several Mexican Sages; the tendrils of the Pea tribe; the Pitchers of the Sarracenia, &c., and those of the Nepenthes, which are leaf, tendril, and pitcher combined. The leaves also appear under very different aspects in the same individual plant, according to the purposes they are intended to subserve. The first pair of leaves, or cotyledons, as in the Bean and Almond, gorged with nutritive matter for the supply of the earliest wants of the embryo-plant, seem to be peculiar organs. But when they have discharged this special office in germination, by yielding to the young plant their store of nourishment with which they are laden, they throw off their disguise, and assume the color and appearance of ordinary foliage. As the stem elongates, the successive leaves vary in form or size, according to the varying vigor of vegetation. In our trees, we trace the last leaves of the season into bud-scales; and in the returning spring, we often observe the innermost scales of the expanding leaf-buds to resume, the first perhaps imperfectly, but the ensuing ones successfully, the appearance and the ordinary office of leaves.

"Analogy would therefore suggest, that in the final act of vegetable development, in flowering, the leaves, no longer developing as mere foliage, are now wrought into new forms, to subserve peculiar purposes. In the chapter on Inflorescence, we have already shown, that the arrangement and situation of flowers upon a stem conform to this idea. In this respect, flowers are absolutely like branches. The aspect of the floral envelopes favors the same view. We discern the typical element, the leaf, in the calyx; and again, more delicate and refined, in the petals. In numberless instances, we observe a regular transition from ordinary leaves into sepals, and from sepals into petals. And, while the petals are occasionally green and herbaceous, the undoubted foliage sometimes assumes a delicate texture and the brightest hues. Familiar cases of the latter kind have just been alluded to." — pp. 208-211.

Then follows the ordinary class of illustrations with some novel examples; and our author continues: —

"The irresistible conclusion from all such evidence is, that the flower is one of the forms,—the ultimate form,—under which branches appear; that the leaves of the stem, the leaves or petals of the flower, and even the stamens and pistils, are all forms of a common type, only differing in their special development. And it may be added, that in the earliest state in which these parts are discernible with a powerful microscope, they all appear alike. That which, under the ordinary laws of vegetation, would have developed as a leafy branch, does, from peculiar causes, finally develope as a flower; its several organs appearing under forms, some of them slightly and others extremely different in aspect and in office from the foliage. But they all have a common nature and a common origin.

"Now, as we have no general name to comprehend all those organs which, as leaves, bud-scales, bracts, sepals, petals, stamens, &c., successively spring from the ascending axis, or stem, having ascertained their essential identity, we naturally, and indeed necessarily, take some one of them as the *type*, and view the others as modifications, or metamorphoses of it. The leaf is the form which earliest appears, and is the most general of all the organs of the vegetable; it is the form which is indispensable to vegetation, in which it plays, as we have seen, the most important part; it is the form into which all the floral organs may sometimes be traced back by numerous gradations, and to which they are liable to revert when flowering is disturbed, and the proper vegetative forces again prevail. Hence the leaf is properly assumed as the type, to which all the others are to be referred. When, therefore, in accordance with these theoretic views, the floral organs are termed *modified* or *metamorphosed leaves*, it is not to be supposed that a petal has ever actually been a green leaf, and has subsequently assumed a more delicate texture and hue, or that stamens and pistils have previously existed in the state of foliage; but only that what is fundamentally one and the same organ developes, in the progressive evolutions of the plant, under any of these various forms. When the individual organ is once developed, its destiny is fixed."—pp. 215, 216.

Great additions have been made to the portion which treats of cryptogamous plants. Before listening to the lectures of Professor Gray at the Lowell Institute, we had been accustomed to regard the study of these plants as possessing little general interest. But we have now learned that the Ferns, the Lichens, Mushrooms, Algæ, and Confervæ are all curious and interesting subjects of inquiry. Among these we are to seek for the links which unite the animal and the vegetable kingdom; and it is singular enough, that the plants which in form and development exhibit the nearest approach to animals are found among the lowest, or more properly speaking, the most obscure, of their race. If, too, we would pursue the study of adaptation and design in vegetables, we shall find the most abundant illustrations among the flowerless plants.

We notice some verbal errors in this volume. In the note on page 95, the sesquipedalian words "monocotyledonous" and "dicotyledonous" are evidently transposed, so as to render the statement just the reverse of what it was intended to be. In the very interesting account of the chemical influences of vegetation upon the atmosphere, there is an obvious typographical error, twenty-four for twenty-two, as the context shows.

We must not omit reference to the very neat and tasteful manner in which the mechanical part of this book is finished. Its outside is as attractive as the subject of which it treats, the binding, print, paper, and engravings being not merely unexceptionable, but elegant. This is such a rare merit in a mere manual of instruction, and at the same time, as we consider it, a point of so much importance, that it deserves especial notice and commendation.

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5. — *Hebrew Tales, selected and translated from the Writings of the Ancient Hebrew Sages.* Boston: Crosby & Nichols. 1845. 18mo. pp. 100.

This little compilation is not made exclusively for the use of the young, although they will profit by it most largely; but readers of all classes may be made wiser and better by the simple and striking lessons which it contains. The selection is made from a work of the same title, which was published some time ago by the learned Hebraist, Hurwitz. From the Talmud, and other similar collections of ancient Jewish writings, he culled a large number of moral sayings, parables, and narratives, the forms in which the wisdom of the Orientals is usually embodied, and put them forth for the entertainment and instruction of a later age and a Christian people. This collection the American editor has sifted over again with good taste and discretion, and has thus formed quite a remarkable little book, which we can cordially commend to the attention of our readers. The simplicity of the style, the aptness of the illustrations, and the beauty of the sentiment or thought often remind one of favorite passages of Holy Writ. The lessons here taught come with less authority, indeed, than if borrowed from the sacred volume; but they are impressive and sound, affecting the imagination strongly from their decided hue of Orientalism, and adapted to purify and elevate the heart and the life. The publication will do much good, also, if it should induce some who make a boast of their Christian faith to surrender at least a portion of their anti-Jewish prejudices.